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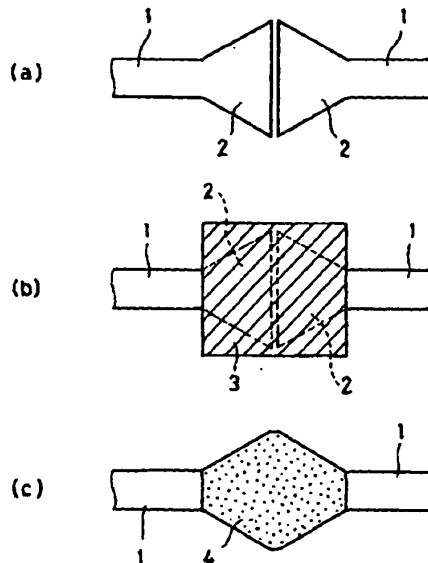
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(54)【発明の名称】 閉回路形成用電極の短絡方法

(57)【要約】

【目的】一対の閉回路形成用電極の短絡方法であって、その短絡が確実におこなえるようにする。

【構成】配線パターンに接続されたその配線パターン側が狭くなるような形状の一対の閉回路形成用電極を所定のギャップをおいて対向するように形成し、その一対の閉回路形成用電極の上から、この電極よりも大きな面積を有する領域に半田ペーストを印刷し、この半田ペーストを加熱して溶融することにより前記一対の閉回路形成用電極をその溶融した半田で短絡する。



## 【特許請求の範囲】

【請求項1】 基板上において、配線パターンに接続されたその配線パターン側が狭くなるような形状の一対の閉回路形成用電極を所定のギャップをおいて対向するように形成し、その一対の閉回路形成用電極の上からこの電極よりも大きな面積を有する領域に半田ペーストを印刷し、その半田ペーストを加熱して溶融することにより前記一対の閉回路形成用電極をその溶融した半田で短絡することを特徴とする閉回路形成用電極の短絡方法。

## 【発明の詳細な説明】

## 【0001】

【産業上の利用分野】本発明は、ハイブリッドIC等の複合回路部品において用いられる閉回路形成用電極の短絡方法に関する。

## 【0002】

【従来の技術】ハイブリッドIC等の複合回路部品において、たとえば閉回路中に接続されている抵抗体をトリミングしようとする場合、その抵抗体の抵抗値が単独で測定できるようになっている必要がある。

【0003】ところが、閉回路中に他の抵抗体が接続されていると、その抵抗体の抵抗値の影響をうけてトリミングしようとする抵抗体自身の抵抗値が測定できないため、正確なトリミングが不可能となる。

【0004】そのため、そのトリミングをしようとする抵抗体については、閉回路を形成する配線パターンの一部をあらかじめ切断した状態にして他の抵抗体の影響をうけないようにしておき、トリミングが終了した後にその切断されている配線パターンを接続して閉回路を形成するということが行われている。

【0005】このような閉回路の形成手段として、従来から図3に示すような方法が採用されている。すなわち、図3(a)に示すように、複合回路部品を形成する基板上において、配線パターン11、11に接続された矩形形状の一対の閉回路形成用電極12、12を所定のギャップをおいて対向するように形成しておく。このままではまだ閉回路が形成されていないので、たとえば抵抗体のトリミングが可能な状態となっている。そして、トリミング等が終了した後、図3(b)に示すように、一対の閉回路形成用電極12、12の上からその電極12、12の周囲を取り囲むような面積を有する領域に半田ペースト13を印刷する。その後、半田ペースト13を加熱して溶融すると、図3(c)に示すように、溶融した半田14によって閉回路形成用電極12、12が短絡され、閉回路が形成される。

## 【0006】

【発明が解決しようとする課題】一方、昨今、集積回路等の基板上に搭載する電子部品のリードピッチのファイン化にともない、リード間で短絡の生じにくいファインピッチ用の半田ペーストが開発され、導入されてきている。

【0007】ところが、このような半田ペーストでは、その半田ペーストの性質上、上記の閉回路形成用電極12、12間においても短絡が生じにくくなるため、確実な閉回路の形成が困難となり、半田こて等で手直しをしなければならぬという問題が生じる。

【0008】したがって、本発明においては、上記のようなファインピッチ用の半田ペーストを用いた場合でも、閉回路形成用電極の短絡が確実におこなえるような閉回路形成用電極の短絡方法を提供することを目的としている。

## 【0009】

【課題を解決するための手段】このような目的を達成するため、本発明の閉回路形成用電極の短絡方法においては、配線パターンに接続されたその配線パターン側が狭くなるような形状の一対の閉回路形成用電極を所定のギャップをおいて対向するように形成し、その一対の閉回路形成用電極の上からこの電極よりも大きな面積を有する領域に半田ペーストを印刷し、その半田ペーストを加熱して溶融することにより前記一対の閉回路形成用電極をその溶融した半田で短絡することを特徴としている。

## 【0010】

【作用】配線パターン側が狭くなるような形状の一対の閉回路形成用電極を所定のギャップをおいて対向するように形成し、その電極よりも大きな面積を有する領域に半田ペーストを印刷したことにより、閉回路形成用電極の配線パターン側の狭い部分の外側の領域にある半田ペーストが溶融されることによって閉回路形成用電極に引き寄せられ、その電極面をつたって電極上に均一に広がっていく。そのため、その一対の閉回路形成用電極のギャップ付近の溶融半田量も多くなり、その一対の電極が容易に短絡されることになる。

## 【0011】

【実施例】以下、本発明の実施例を図面を参照して詳細に説明する。

【0012】まず、基板上に配線パターンを形成するときに、図1(a)に示すように、配線パターン1、1に接続されたその配線パターン1、1側が狭くなるような形状の一対の閉回路形成用電極2、2を同時に形成しておく。この一対の閉回路形成用電極2、2は、たとえば、100μm程度の範囲内のギャップをおいて対向するように形成される。

【0013】そして、抵抗体のトリミング等の所定の処理が終了した後に、図1(b)に示すように、一対の閉回路形成用電極2、2の上からこの電極2、2よりも大きな面積を有する領域にファインピッチ用の半田ペースト3を印刷する。

【0014】その後、半田ペースト3を加熱して溶融すると、閉回路形成用電極2、2の配線パターン1、1側の狭い部分の外側の領域にある半田ペースト部分も電極2、2に引き寄せられて電極2、2上に均一に広がって

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いき、図1(c)に示すように、溶融した半田4により一対の電極2、2が短絡される。勿論、この溶融した半田4は次第に冷えて固化する。

【0015】なお、閉回路形成用電極2、2の形状は図2に示すようなものであってもよく、要は配線パターン1、1側が狭くなるようなものであればよい。また、閉回路形成用電極2、2を上記のように形成したことにより、従来からの半田ペーストを用いる場合であっても短絡が確実に起こわれるようになることはいうまでもない。

【0016】

【発明の効果】以上説明したことから明らかなように本発明によれば、配線パターンに接続されたその配線パターン側が狭くなるような形状の一対の閉回路形成用電極を所定のギャップをおいて対向するように形成し、この一対の電極の上から、この電極よりも大きな面積を有する領域に半田ペーストを印刷するようにしたから、一対の閉回路形成用電極の短絡が確実に起こえるようになる。

【図面の簡単な説明】

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【図1】本発明の閉回路形成用電極の短絡方法を説明するための図で、図1(a)は閉回路形成用電極の平面図、図1(b)は図1(a)に示す閉回路形成用電極の上から半田ペーストを印刷した状態を示す図、図1(c)は図1(b)に示す半田ペーストを溶融した後の状態を示す図である。

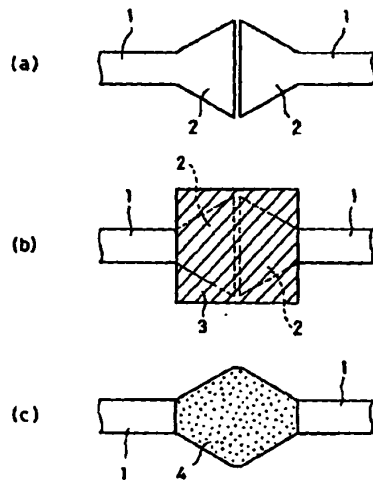
【図2】本発明に用いる閉回路形成用電極の他の形状例を示す図である。

【図3】従来例の閉回路形成用電極の短絡方法を説明するための図で、図3(a)は閉回路形成用電極の平面図、図3(b)は図3(a)に示す閉回路形成用電極の上から半田ペーストを印刷した状態を示す図、図3(c)は図3(b)に示す半田ペーストを溶融した後の状態を示す図である。

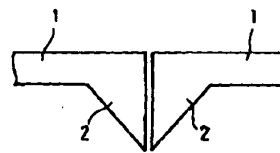
【符号の説明】

- 1 配線パターン
- 2 閉回路形成用電極
- 3 半田ペースト
- 4 溶融した半田

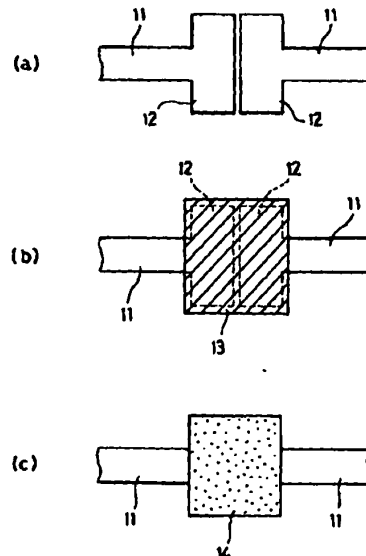
【図1】



【図2】



【図3】



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CLAIMS

[Claim(s)]

[Claim 1] An electrode for closed circuit formation of a pair of a configuration with which the circuit pattern side connected to a circuit pattern on a substrate becomes narrow is formed so that a predetermined gap may be set and countered. A short circuit method of an electrode for closed circuit formation characterized by short-circuiting an electrode for closed circuit formation of said pair with that fused solder by printing soldering paste to a field which has a bigger area than this electrode from on an electrode for closed circuit formation of that pair, and heating and fusing that soldering paste.

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## DETAILED DESCRIPTION

## [Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the short circuit method of the electrode for closed circuit formation used in combination circuit components, such as a hybrid IC.

[0002]

[Description of the Prior Art] In combination circuit components, such as a hybrid IC, when it is going to trim the resistor connected all over the closed circuit, the resistance of the resistor can measure independently.

[0003] However, if other resistors are connected all over the closed circuit, since the own resistance of a resistor which it is going to trim in response to the effect of the resistance of the resistor cannot be measured, exact trimming becomes impossible.

[0004] Therefore, about the resistor which is going to carry out the trimming, after changing into the condition of having cut beforehand some circuit patterns which form a closed circuit, making it not receive the effect of other resistors and completing trimming, connecting the circuit pattern currently cut and forming a closed circuit is performed.

[0005] As means forming of such a closed circuit, the method as shown in drawing 3 from the former is adopted. That is, as shown in drawing 3 (a), the electrodes 12 and 12 for closed circuit formation of a rectangle-like pair connected to circuit patterns 11 and 11 on the substrate which forms combination circuit components are formed so that a predetermined gap may be set and countered. Since the closed circuit is not yet formed the way things stand, it is in the condition in which the trimming of a resistor is possible, for example. And after trimming etc. is completed, as shown in drawing 3 (b), soldering paste 13 is printed to the field which has area which encloses the perimeter of the electrodes 12 and 12 from on the electrodes 12 and 12 for closed circuit formation of a pair. Then, if soldering paste 13 is heated and fused, as shown in drawing 3 (c), with the fused solder 14, the electrodes 12 and 12 for closed circuit formation will short-circuit, and a closed circuit will be formed.

[0006]

[Problem(s) to be Solved by the Invention] On the other hand, with the finization of the lead pitch of the electronic parts carried on substrates, such as an integrated circuit, the soldering paste for fine pitches which is between leads and a short circuit cannot produce easily is developed, and it has been introduced these days.

[0007] However, in such soldering paste, on the property of the soldering paste, since it is hard coming to generate a short circuit between the above-mentioned electrode 12 for closed circuit formation, and 12, formation of a positive closed circuit becomes difficult and the problem that it must repair with a soldering iron etc. arises.

[0008] Therefore, in this invention, even when the above soldering paste for fine pitches is used, it aims at offering the short circuit method of the electrode for closed circuit formation that the short circuit of the electrode for closed circuit formation can be ensured.

[0009]

[Means for Solving the Problem] In order to attain such a purpose, it sets to a short circuit method of an electrode for closed circuit formation of this invention. It forms like. an electrode for closed circuit formation of a pair of a configuration with which the circuit pattern side connected to a circuit pattern becomes narrow -- a predetermined gap -- setting -- opposite \*\*\*\* -- Soldering paste is printed to a field which has a bigger area than this electrode from on an electrode for closed circuit formation of that pair, and it is characterized by short-circuiting an electrode for closed circuit formation of said pair with that fused solder by heating and fusing that soldering paste.

[0010]

[Function] By having formed an electrode for closed circuit formation of the pair of a configuration with which a circuit pattern side becomes narrow so that a predetermined gap might be set and countered, and having printed soldering paste to the field which has a bigger area than the electrode, by carrying out melting of the soldering paste in the field of the outside of the narrow portion by the side of the circuit pattern of the electrode for closed circuit formation, it can draw near to the electrode for closed circuit formation, and the electrode side is spread in homogeneity on the electrode as \*\*\*\*. Therefore, the amount of melting solder near the gap of the electrode for closed circuit formation of the pair will also increase, and the electrode of the pair will short-circuit easily.

[0011]

[Example] Hereafter, the example of this invention is explained to details with reference to a drawing.

[0012] First, when forming a circuit pattern on a substrate, as shown in drawing 1 (a), the circuit pattern 1 connected to circuit patterns 1 and 1 and the electrodes 2 and 2 for closed circuit formation of the pair of a configuration with which 1 side becomes narrow are formed in coincidence. The electrodes 2 and 2 for closed circuit formation of this pair are formed so that the gap of about 100 micrometers within the limits may be set and it may counter.

[0013] And after predetermined processing of the trimming of a resistor etc. is completed, as shown in drawing 1 (b), the soldering paste 3 for fine pitches is printed to the field which has a bigger area than these electrodes 2 and 2 from on the electrodes 2 and 2 for closed circuit formation of a pair.

[0014] Then, if soldering paste 3 is heated and fused, as the soldering paste portion in the field of the circuit pattern 1 of the electrodes 2 and 2 for closed circuit formation and the outside of the narrow portion by the side of one can also be drawn near to electrodes 2 and 2, spreads in homogeneity on an electrode 2 and 2 and is shown in drawing 1 (c), the electrodes 2 and 2 of a pair will short-circuit with the fused solder 4. Of course, this fused solder 4 gets cold gradually, and is solidified.

[0015] A circuit pattern 1 side and 1 side seem in addition, for what is necessary to be just to become narrow in short, as the configuration of the electrodes 2 and 2 for closed circuit formation may be shown in drawing 2. Moreover, by having formed the electrodes 2 and 2 for closed circuit formation as mentioned above, even if it is the case where the soldering paste from the former is used, it cannot be overemphasized that a short circuit comes to be ensured.

[0016]

[Effect of the Invention] An electrode for closed circuit formation of the pair of a configuration with which that circuit pattern side connected to the circuit pattern becomes narrow according to this invention is formed so that a predetermined gap may be set and countered, so that clearly from having explained above, and since soldering paste was printed to the field which has a bigger area than this electrode from on the electrode of this pair, the short circuit of the electrode for closed circuit formation of a pair can be ensured.

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TECHNICAL FIELD

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[Industrial Application] This invention relates to the short circuit method of the electrode for closed circuit formation used in combination circuit components, such as a hybrid IC.

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## PRIOR ART

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[0004] Therefore, about the resistor which is going to carry out the trimming, after changing into the condition of having cut beforehand some circuit patterns which form a closed circuit, making it not receive the effect of other resistors and completing trimming, connecting the circuit pattern currently cut and forming a closed circuit is performed.

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EFFECT OF THE INVENTION

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[Effect of the Invention] An electrode for closed circuit formation of the pair of a configuration with which that circuit pattern side connected to the circuit pattern becomes narrow according to this invention is formed so that a predetermined gap may be set and countered, so that clearly from having explained above, and since soldering paste was printed to the field which has a bigger area than this electrode from on the electrode of this pair, the short circuit of the electrode for closed circuit formation of a pair can be ensured.

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TECHNICAL PROBLEM

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MEANS

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[Means for Solving the Problem] In order to attain such a purpose, it sets to a short circuit method of an electrode for closed circuit formation of this invention. It forms like. an electrode for closed circuit formation of a pair of a configuration with which the circuit pattern side connected to a circuit pattern becomes narrow -- a predetermined gap -- setting -- opposite \*\*\*\* -- Soldering paste is printed to a field which has a bigger area than this electrode from on an electrode for closed circuit formation of that pair, and it is characterized by short-circuiting an electrode for closed circuit formation of said pair with that fused solder by heating and fusing that soldering paste.

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OPERATION

[Function] By having formed an electrode for closed circuit formation of the pair of a configuration with which a circuit pattern side becomes narrow so that a predetermined gap might be set and countered, and having printed soldering paste to the field which has a bigger area than the electrode, by carrying out melting of the soldering paste in the field of the outside of the narrow portion by the side of the circuit pattern of the electrode for closed circuit formation, it can draw near to the electrode for closed circuit formation, and the electrode side is spread in homogeneity on the electrode as \*\*\*\*. Therefore, the amount of melting solder near the gap of the electrode for closed circuit formation of the pair will also increase, and the electrode of the pair will short-circuit easily.

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DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] It is drawing for explaining the short circuit method of the electrode for closed circuit formation of this invention, and drawing showing the condition of having printed soldering paste from on the electrode for closed circuit formation which shows drawing 1 (a) in the plan of the electrode for closed circuit formation, and shows drawing 1 (b) to drawing 1 (a), and drawing 1 (c) are drawings showing the condition after fusing the soldering paste shown in drawing 1 (b).

[Drawing 2] It is drawing showing other examples of a configuration of the electrode for closed circuit formation used for this invention.

[Drawing 3] It is drawing for explaining the short circuit method of the electrode for closed circuit formation of the conventional example, and drawing showing the condition printed soldering paste from on the electrode for closed circuit formation which shows drawing 3 (a) in the plan of the electrode for closed circuit formation, and shows drawing 3 (b) to drawing 3 (a), and drawing 3 (c) are drawings showing the condition after fusing the soldering paste shown in drawing 3 (b).

[Description of Notations]

- 1 Circuit Pattern
- 2 Electrode for Closed Circuit Formation
- 3 Soldering Paste
- 4 Fused Solder

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[Translation done.]

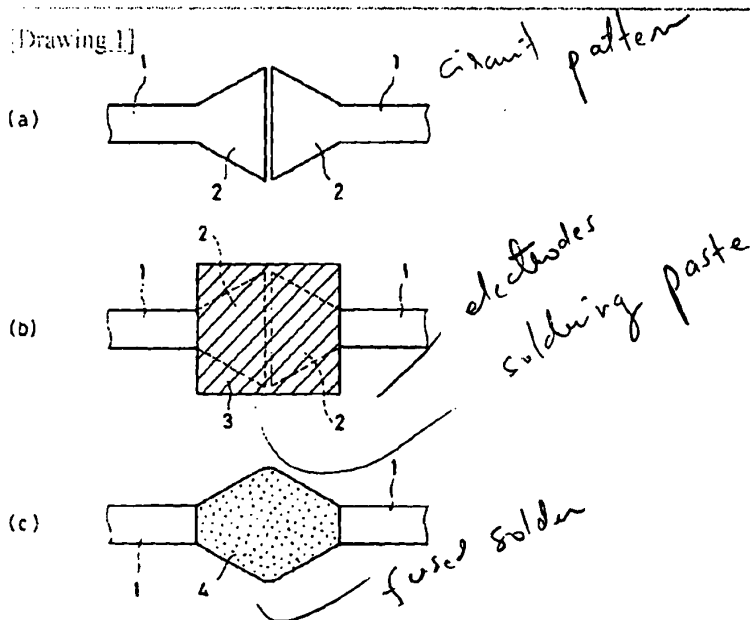
## \* NOTICES \*

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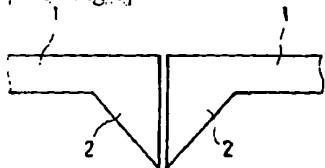
1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

## DRAWINGS

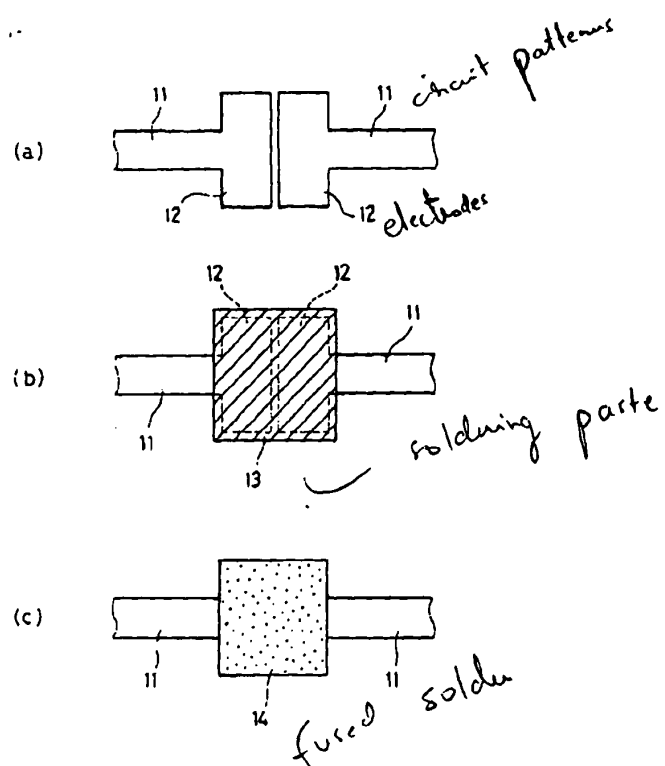
[Drawing 1]



[Drawing 2]



[Drawing 3]



[Translation done.]